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REMARKS

By the present amendment applicant confirms the election of the invention of claims 1-18 in this case, claims 19-21 having been canceled without prejudice to applicant's rights to file a divisional application on the subject matter thereof.

With respect to paragraphs 5 and 6 on page 3 of the Action, changes have been made to the specification to remove the objections.

With respect to the 35 U.S.C. §112 rejection of paragraph 7 on page 3 of the Action reconsideration is respectfully requested. The phrase indicates the amount of alkali consumed as a percentage of the cellulose material, and the expression of percentage on wood is common in the art. For example attention is directed to column 10, line 62 ("EA charge on wood (percentage)) and column 11, lines 30 and 63 of the Li reference applied in this case, which uses the same terminology. Also, see enclosed pages 13, 14 and 98 of Vol. 5 of the authoritative Grace textbook Pulp and Paper Manufacture. Therefore, it is believed that claims 13 and 14 (and new claim 28) are definitely in compliance with 35 U.S.C. §112.

By the present amendment claims 2, 4, 5, 7, and 19-21 have been canceled without prejudice. New claims 22-28 have been submitted. Some of the new claims specifically relate to the counter-current cooking stage, for example as specifically illustrated (although the claims relate to other embodiments) in FIGURES 10 and 14 of the instant application drawings, the counter-current cooking shown between screens 85 and 95 in FIGURE 10. Others of the added dependent claims relate to other

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features. It is respectfully submitted that all of the presently-pending claims clearly distinguish from the art.

Reconsideration is respectfully requested of the rejections in paragraphs 10 and 11 on pages 4 and 5 of the Action of claims 1, 3, 6, 8, 9, and 12-17 (or as they might be applied to newly entered claims 22-28) as anticipated by or obvious over Li. It is respectfully submitted that Li does not teach the claim method, nor is the invention obvious over Li.

While Li does have a disclosure therein that makes a tangential reference to continuous digestion, in fact Li's enabling disclosure is for all practical purposes limited to a batch digester. The only places where continuous digesting are mentioned - as far as the undersigned can determine - are in column 3, line 44, column 5, lines 11-30, and column 8, line 61 - column 9, line 24. The examples and the graphs provided in Li, as well as the claims, are specifically directed to batch processes. Batch and continuous processes in the production of pulp are not simply interchangeable, and have numerous aspects that are different. Also the process conditions that are provided in a batch digester do not necessarily transfer over to a continuous digester, and there is nothing about a teaching with respect to a batch digester that can be said to provide an inherent teaching in a continuous digester in the context of what Li teaches.

This is especially significant with respect to FIG. 10 of Li which is supposedly a description in Li which provides a teaching of continuous digester operation. All that Li does here is contrast the "conventional" continuous digester of FIG. 9 to his continuous

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digester in which the temperature in the lower portion of the digester is increased while that of the upper portion is decreased, the lower portion of the digester has a co-current cook zone rather than a counter-current zone, liquid is somehow added (how is totally not understood nor enabling in FIG. 10) to increase the effective alkali charge in the bottom of the continuous digester, and after being blown from the digester spent liquor is somehow (again, not properly explained) separated from the pulp in line 337 [i.e., not in the digester], which is then somehow used to make the first stage treatment liquor.

The disclosure in column 5, lines 11-31, of Li appears to be at odds with what is illustrated in FIGURE 10. In column 5 it is stated that second stage cooking liquor is added into the digester via the lower set of screens (presumably the screens is 315 in FIG. 10), however FIGURE 10 shows pumps extracting liquid through the lower sets of screens therefore it is not seen how the liquor can possibly be added by the screens 315. There is no description of reference numeral 334 that the undersigned can find in Li, but presumably that is where the second stage liquor is supposed to be added, yet how it gets into the screens 315, or how it then flows downwardly with the wood chips, is nowhere described nor apparent.

Thus it is respectfully submitted that Li actually teaches nothing useful about continuous digesters, or how the batch operation he describes (in which he uses two different effective alkali liquids in the different batch stages) can possibly be applied to a continuous process. Therefore even if Li were otherwise relevant (which is not believed the case, as will be explained below) Li does not teach the continuous digestion of

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wood chips or other cellulose material which is a necessary feature of all of applicant's claims.

Applicant has recognized that in a continuous digester the effective alkali where the cook is terminated, and sometime before it, is desirably at a particular level in order to get increased intrinsic fiber strength and other desirable properties. This is made clear, for example, from particularly the graphs of FIGURES 8, 9, and 11, 12 and 13-17 of the instant application drawings. These graphs show not only a desired strength (see FIG. 11) when residual alkali is at a certain level, but indicate that the desired strength-enhancing effect may in some cases top out (see the downward trend for the particular embodiment of the curve in FIGURE 11, starting at about 35 g/l).

The independent claims 1 and 16 have been amended to provide an effective range of effective alkali concentration expressed as NaOH or equivalent, the range being recited as between 20-50 g/l in claim 1, for at least the last minute of the cook, and between 20-40 g/l, for during at least the last 15 minutes, in claim 16.

Not only does LI not teach how effective alkali levels as are provided according to the claimed invention can be achieved in a continuous digester, even for the batch digester processes LI's disclosure is different than that according to the invention.

It should be noted that LI discloses effective alkali ("EA") in terms of Na_2O g/l rather than g/l as NaOH as is set forth in the instant application specification. To convert EA of g/l Na_2O to EA of g/l NaOH, the Na_2O values must be multiplied by the ratio 80/62. Therefore it is to be understood that when various levels are mentioned in

EA Na_2O \rightarrow EA NaOH
 $\times \frac{80}{62}$

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the arguments below for Li that those levels are -- for the purposes of comparison with the instant application -- the values in the Li disclosure multiplied by the ratio 80/62; therefore, the exact numbers in the arguments will not be found in the Li disclosure.

--At column 4, lines 12 and 13 for the batch process he describes there, Li gives the range of EA of the second stage cooking liquor as 28.4-36.1 g/l as NaOH. This is, as far as the undersigned can determine, the EA of the second stage liquor as it is introduced into the cook, not the end of the cook conditions.

--In column 4, lines 28-29 the EA of the "spent second stage liquor" is specified as 16.8-20.6 g/l as NaOH; thus, the EA of the last part of the second stage cook is also almost certainly within this range of 16.8-20.6 g/l as NaOH.

--In column 4, lines 41-45 a concentration profile in the second stage as indicated as 16.8-24.6 g/l as NaOH. The undersigned can only interpret this to mean that the EA varies from 24.6 to 16.8 as the second stage progresses, meaning that the EA at the end of the second stage cook is around 16.8 g/l.

--FIGURE 3 also includes an alkali profile. The EA curve in this figure appears to indicate a sudden increase from the beginning of the second stage (at about 125 minutes into the cook) and then a decrease to what appears to be the end of the cook at about 175 minutes. By scaling the numbers from the graph of FIGURE 3, to the extent feasible, it appears that the EA profile ranges from 22 g/l to 18 g/l in the second stage, i.e., about 18 g/l at the end.

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Thus, it is believed that Li shows, for his batch process, an "accidental" maximum end of the cook EA of 20.6 g/l as NaOH, with practical discussion of that maximum end of cook EA of about 16.8 g/l as NaOH (column 4, lines 12-45 of the specification) or 18 g/l as NaOH (FIG. 3 of the drawings). Li does not have any recognition whatsoever that it is possible - in a continuous digester - to obtain increased strength, or that (as shown in FIG. 11 of the instant application drawings) that there will come a point (around 35 g/l) where the increase in strength properties may terminate, and the effective alkali higher concentration (which requires more chemical in the system) not only does not give any increased benefit, but the benefit may actually be reduced.

Thus, even considering the batch disclosure in Li, there is absolutely no teaching of a range with a desired lower level of at least about 20, or desired higher level of 50 or less (for claim 1, 40 or less for claim 16), and therefore, there is no anticipation or obviousness.

The dependent claims even more clearly distinguish from Li. For instance, the particular range of between 21-35 in claim 3, 25-35 in claim 6, and 25-35 in claim 17 (which are supported by FIG. 11 and by the paragraph bridging pages 22 and 23 of the specification, and in particular page 23, line 1, and page 45, line 5), are not shown even in the accidental highest end of the cook batch disclosure in Li of 20.6 g/l. Other dependent claims also clearly distinguish. For example the undersigned cannot find in the Li reference -- nor is where within Li they might be found pointed out in the previous

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action — limiting the effective alkali concentration during this practice to less than 35 g/l (there is no limit at all discussed with respect to the continuous digester in Li and for the batch digester the second stage cooking liquor addition may be as high as 36.1 g/l as NaOH, as provided in column 4, lines 12-13) as recited in claims 12-15, or using a counter-current cook or counter-current wash in the continuous digester as recited in a number of newly-added claims. With respect to the counter-current cook or wash claims, such as new claim 22, not only does Li not teach such a feature, this is specifically and unequivocally against the teaching in FIGURE 10 of Li (the only continuous digester embodiment) where Li's embodiment is specifically distinguished from prior art where there was counter-current washing (see FIG. 9). Li insists on entirely co-current cooking all the way through the end of the digester (see column 8, line 61-column 9, line 24). It cannot, of course, be considered obvious to one of ordinary skill in the art to go specifically against the teachings of the prior art and render it incapable of performing as specifically required or disclosed therein. In this regard see *Ex parte Thompson*, 184 USPQ 558, 559 (Bd App 1974), wherein the Board held:

"The appellant notes that the central theme of the Ericson disclosure is a ceiling grid with controlled ventilation which is obtained by slotting all of the runners and by providing in association therewith apertured slide plates. The appellant also notes that Ericson teaches that the slide plates be located on the ceiling sided of the grid, that they be an integral part of the runner structure, i.e., not removeable without breaking or at least disassembling the runner, and that the slide plates be moveable between fully opened and closed limit positions. It is the appellant's position that it would not be obvious to substitute the non-

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apertured strips of Klein for the apertured slide plates of Ericson, since to do so would destroy the Ericson apparatus for its intended purpose. We agree with the appellant's position and, thus, we do not sustain the rejections of the appealed claims." (Emphasis added.)

Also see *Ex parte Hartmann*, 186 USPQ 366, 367 (Bd. App. 1974).

There also is no obviousness of the invention recited in claims 1 and 16 over Li. Li does not recognize the intrinsic strength properties can be improved by controlling effective alkali as according to the claimed invention, nor is there any suggestion provided whatsoever as to any reason why one might modify Li's procedures in order to obtain the claimed invention.

Also, the novel and unobviousness of the present invention have been recognized by the fact that prestigious pulp publications have published articles dealing with the claimed invention. Enclosed herewith is an article from the April 1997 issue of the well-recognized journal "Paper and Timber" in which the inventor, and two co-authors, describe the advantages that can be achieved by controlling the end of cook EA concentrations according to the claimed invention. For example, see the graphs of Figures 6 and 7 on page 237 of this article. Also enclosed herewith is a paper presented by the inventor and several co-authors at the invitation of the 1997 Pulping Conference (which took place in September 1997), attention being particularly directed to Figure 2 on page 588 thereof. Also, see the advantages discussed on pages 589 and 590, and the description of the Mill Scale Trial on pages 590 and 591.

There are also differences between true operation of the Li process and that according to the claimed invention. While in column 4, lines 19 through 21, Li specifies

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a total H factor of between 1200-1800, according to the claimed method an H factor of below 1,000 may be provided. Li also has higher temperature and H factor and the first stage of treatment than according to the invention, and introduces more fresh cooking chemical to the beginning of the cook.

Thus, it is believed that all of the claims clearly patentably distinguish from the art and early passage to issue is earnestly solicited.

Also enclosed herewith is a copy of U.S. Patent No. 3,652,384 and a form PTO-1449 listing it, the reference being in the English language and the appropriate fee for consideration of this reference after the first Official Action is also being provided herewith. Please initial, date and return the enclosed form PTO-1449. Attention is again -- as with the original papers submitted -- directed to the art of record in the parent application which is now U.S. Patent No. 5,635,026.

Should any matters remain outstanding it is requested that the undersigned attorney be given a call so that such matters may be worked out and the application placed in condition for allowance without the necessity of another Action and amendment.

Respectfully submitted,

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